PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 39813	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI 2003/000534	International filing date *(day/month/year)* 02.07.2003	Priority date *(day/month/year)* 05.07.2002
International Patent Classification (IPC) or national classification and IPC B02C 1/00, B02C 2/00, B02C 7/12, B02C 25/00		
Applicant METSO MINERALS (TAMPERE) OY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:

   ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

   ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

   _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
12.01.2004	04.10.2004
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI 2003/000534

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-3 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 5-6 received by this Authority on 18.06.2004
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
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Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-8	YES
	Claims		NO
Inventive step (IS)	Claims	1-8	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Document cited in the International Search Report:

D1: WO 01067044 A3

New claims have been filed on 18 June 2004. New independent claim 1 features the old claim 1 and the characterizing parts of old claims 2-4. New claims 2 and 3 have been introduced. New independent claim 4 features old claim 5 plus the addition "a self-contained energy source". This addition is also incorporated in new claims 5-7.

New independent claims 1 and 4
D1 is considered to represent the closest prior art. From D1 (see page 1, lines 10-24; page 31 lines 4-11 and claim 1), a method and apparatus for monitoring/measuring e.g. the pressure of a refining zone, in order to define the refiner gap, are known. The apparatus and method in D1 comprise a control system, wireless information transmission and sensors.

It is not clearly stated in D1 that the control system initiates predetermined actions, such as an alarm. However, it is a control system, and the sensors are connected to the refiner disc, and therefore it seems obvious that some type of action must be taken, otherwise it would be unnecessary to have the control system and sensors.

However, what substantially differs between the invention and D1 is that it is a method and apparatus for monitoring the amount of erosion in the wearing parts of a crusher. Nothing is mentioned or hinted at in D1 about the erosion of the sensor discs.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

Therefore, the invention according to new independent claims 1 and 4 is novel and is considered to have inventive step.

Thus, also the rest of the claims are novel and inventive.

The invention is industrially applicable.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

In new claim 1, on line 9, it is assumed that it should say "one of" instead of "on of".

What is claimed is:

1. A method for monitoring the amount of erosion in the wearing parts of a crusher, in which method the erosion of the wearing parts of a crusher is monitored by the crusher's automatic control system and, as erosion in the wearing parts reaches a predetermined depth, the control system initiates predetermined actions, which actions comprise issuing an alarm, **characterized** in that information on the amount of erosion in a wearing part of the crusher is transmitted wirelessly to the automatic control system of the crusher and that the predetermined actions further comprise at least on of the following actions: stopping the crusher or stopping material infeed to the crusher or ordering a wearing part for the crusher.

2. The method of claim 1, **characterized** in that the predetermined depth of erosion of the wearing parts is such that the crusher operation can be continued using the old wearing part during the delivery time of the new wearing part.

3. The method of claim 1 or 2, **characterized** in that a plurality of separate wear sensors connected to the crusher control system is utilized so that different kind of actions are initiated depending on the sensor of the system issuing an alarm.

4. An apparatus for monitoring the amount of erosion in the wearing parts of a crusher, the apparatus comprising an automatic control system of the crusher, and at least one wear sensor mounted on the wearing part of the crusher, **characterized** in that said wear sensor is equipped with means for transmitting the measurement signal wirelessly to the automatic control system of the crusher and with a self-contained energy source.

5. The apparatus of claim 4, **characterized** in that the self-contained energy source comprises means for converting kinetic energy into electrical energy.

6. The apparatus of claim 4, **characterized** in that the self-contained energy source comprises a piezoelectric device for generating electrical energy.

7. The apparatus of claim 4, **characterized** in that the self-contained energy source comprises means for capturing electrical energy from an electromagnetic field launched about the crusher.

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8. The apparatus of any one of claims 4-7, **characterized** in that the wear sensor comprises a conductor embedded in an insulator.